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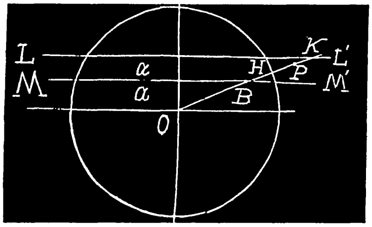
nothing but the Conchoid of Nicomedes. This can be shown as follows:



In the figure, let LL' be parallel to the x-axis at a distance $2a$, and draw MM' parallel to LL' and half way between it and the x-axis. Let OHK be any line through O, and let P bisect HK. $OB=\frac{1}{2}OK$, $OH=r$. Therefore, $OP=\frac{1}{2}(OH+OK)=\frac{1}{2}r+OB$.

$\therefore OP-OB=BP=\frac{1}{2}r=$constant.

Therefore, the locus of P is a conchoid.

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DEPARTMENTS.

SOLUTIONS OF PROBLEMS.

ALGEBRA.

No satisfactory solutions of Nos. 283, 284, 285, have yet been received. A solution of 283 will appear in the next issue.

287. Proposed by WALTER D. LAMBERT, 416 B Street N. E., Washington, D. C.

For what fraction of a year will there be the greatest difference between the interest as computed by the ordinary commercial rule and that computed by the rule of compound interest?

Solution by THEODORE L. DeLAND, Treasury Department, Washington, D. C.

Let x=the fractional part of a year; r=the rate per annum; \$1=the principal; rx=the simple interest; $(1+r)^x-1$=the compound interest; and y=the greatest difference.

When the time is less than one year the simple interest exceeds the compound interest, therefore

$$y=rx-(1+r)^x+1, \text{ a maximum.}$$

Differentiate, and we have, when m=the modulus,

$$dy/dx=r-(1+r)^x\log(1+r)/m.$$

Equate to zero and we have

$$(1+r)^x\log(1+r)=mr; \text{ or } x=\log[rm/\log(1+r)]/\log(1+r).$$

Also solved by G. B. M. Zerr.